PATENT
FINAL

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of:

Shigeo KURE et al.

Serial Number: 09/740,969 Group Art Unit: 1764

Filed: December 21, 2000 Examiner: W. D. Griffin

For: REACTOR FOR HYDROTREATING AND PROCESS FOR PRODUCING ULTRALOW SULFUR HEAVY OILS BY THE USE OF THE REACTOR

RESPONSE UNDER 37 C.F.R. § 1.116
TO THE FINAL OFFICE ACTION DATED JUNE 11, 2002

Assistant Commissioner
for Patents
Washington, D.C. 20231 February 10, 2003

Sir:

This paper is submitted in response to the Office Action dated June 11, 2002. A petition for a two-month extension of the period provided by the filing of a Notice of Appeal on October 10, 2002, is being filed concurrently herewith.

Reconsideration of the 35 U.S.C. § 103(a) rejection is respectfully requested in view of the following comments.

In the *Response to Arguments* section of the Action on page 5, the Examiner states that each layer of catalyst of Angevine would

necessarily contain approximately the same number of particles per unit volume because Angevine discloses that the fixed beds of catalyst are preferred to contain 1/32-inch extrudates.

Applicants understand the Examiner's position to be that description in Angevine that "it is preferred to use catalyst particles such as 1/32 inch extrudate or the equivalent disposed in three fixed beds" (Col. 5, lines 19-21) necessarily means that each catalyst particle in each of the catalyst layers preferably has the same size. However, it cannot be concluded that the numerical value of "1/32 inch" disclosed in Angevine is the diameter of an extruder nozzle or the diameter of a catalyst particle because catalyst particles can have various forms such as a trefoil, a quatrefoil and a macaroni-form other than a sphere. Angevine requires only that the catalysts have sequentially decreasing average pore diameters and sequentially increasing surface area and is silent about concrete forms of catalyst particles used.

Even if each particle has a "1/32 inch" dimension, the description of Angevine does not require an interpretation that the three beds include the same particles. It is possible that the three beds comprise particles different in form from each other,

for instance, spherical catalyst particles in the first bed, macaroni-shaped catalyst particles in the second bed and trefoil-shaped catalyst particles in the third bed. Forms of particles other than a sphere such as a trefoil, a quatrefoil, a macaroni-form, etc. need at least two dimensions (e.g., width, length and the like) for calculation of volume. It is not clear from Angevine what dimension forms the numerical value of "1/32 inch". Thus, a person of ordinary skill in the art could not reasonably expect catalysts A, B and C in Table 1 to be of the same size from the limited teachings of Angevine.

Further, even if the 1/32 inch particles in each bed should be the same in form (= the same in dimensions (size)) and even if the beds should contain the same total number of particles as each other, it is not clear from Angevine whether the three beds are also the same as each other in dimensions.[1]

Angevine discloses nothing specific about the number of catalyst particles contained in each fixed bed and does not

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[1]Dimensions of each catalyst layer are related to the pore volume defined in the present invention because said pore volume is the value per cubic meter of each catalyst layer.

disclose the dimensions of each bed. And, as noted above, even if the three fixed beds should be the same as each other in dimensions, it is not definite from Angevine Patent how many particles are contained in each bed (and not definite that the 1/32 inch particles in each bed are also the same in dimensions).

It is apparent that if the fixed beds (layers) are different from each other in dimensions, the particles contained in the fixed beds will be different from each other in the number per unit volume even though the beds would contain the same total number of particles as each other and even though the 1/32 inch particles in each bed are the same in dimensions.

Angevine is also silent about how the catalyst particles are contained in each bed (e.g., how much the bulk density is) such that at least four catalyst layers would satisfy the relationship represented by the formula of $1.15V_n \geq V_{n+1}$ wherein V represents the pore volume per cubic meter of each catalyst layer.

The "Real Density" indicated in Table 1 of Angevine is density obtainable by the formula of *weight of an individual catalyst particle÷volume of an individual catalyst particle* <u>*excluding pore volume*</u> and the "Particle Density" is density obtainable by the

formula of *weight of an individual catalyst particle÷volume of an individual catalyst particle including pore volume*. Applicants presume the reason for Angevine including the real density and the particle density data in Table 1 is because Angevine intends to show also the catalytic effect of components constituting a catalyst particle by disclosing the real density.

The pore volumes shown in Table 1 of Angevine Patent would not satisfy the claimed relationship because the pore volume mentioned in the present invention and that mentioned in Angevine Patent are basically different from each other in definition.

As noted above, Angevine concretely discloses no relationship represented by the formula of $1.15V_n \geq V_{n+1}$, wherein V represents the pore volume per cubic meter of each catalyst layer. The Examiner's position is that this relationship is inherent in the three stage catalyst system disclosed in Table I. However, the data of Table 1 do not enable a person of ordinary skill in the art to calculate the pore volume per cubic meter of each catalyst layer. Therefore, the Examiner's conclusion is necessarily a matter of probability, possibility or conjecture. Inherency, however, may not be established by possibilities or probabilities. The fact that a

limitation might result from the disclosure of a reference is not sufficient. *In re Oelrich*, 666 F.2d 578, 581, 212 USPQ 323, 326 (CCPA 1981) and *In re King*, 801 F.2d 1324, 1326, 231 USPQ 136, 138 (Fed. Cir. 1986). For this reason alone, the rejection is improper and must be removed.

Even if the three stage catalyst system of Angevine somehow satisfies the claimed relationship regarding pore volume per cubic meter of each catalyst layer, to support the 35 U.S.C. § 103(a) rejection, the art must suggest or otherwise provide a motive to modify the art to modify the three stage system of Angevine so as to provide a four stage system which satisfies the relationship. The Federal Circuit has noted that the need for specificity pervades this requirement. *See, e.g., In re Kotzab*, 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1317(Fed. Cir. 2000) ("particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed"); *In re Rouffet*, 149 F.3d 1350, 1359, 47 USPQ2d 1453, 1459(Fed. Cir. 1998) ("even when the level of skill in the art is high, the Board must identify

specifically the principle, known to one of ordinary skill, that suggests the claimed combination.")

In the present case, the Examiner argues that the person of ordinary skill in the art would have modified the process and reactor of Angevine by utilizing at least 4 catalyst layers that satisfy the claimed relationship "because the disclosure of three or more layers coupled with the disclosure of a three catalyst system satisfying the claimed relationships would result in the expectation that the use of a four or more layer catalyst system would be effective for hydroprocessing hydrocarbons." (Action, page 3, lines 3-6 from the bottom of the page).

This statement on its face demonstrates the lack of proper motivation to modify the system of Angevine so as to satisfy the claimed relationship regarding pore volume per cubic meter of each catalyst layer. The person of ordinary skill in the art does not know that the three stage catalyst system of Angevine satisfies the relationship $1.15V_n > V_{n+1}$. It would have been impossible, therefore, for the art-skilled person to have been motivated to select a fourth catalyst layer with the specific aim of satisfying the relationship. As noted above, the Federal Circuit has held that

particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected the components for combination in the manner claimed. The Examiner has provided no particular findings as to why the skilled artisan, with no knowledge of the present invention and no disclosure in the prior art of the desirability of providing at least four catalyst layers that satisfy the relationships $S_n \leq S_{n+1}$ and $1.15V_n > V_{n+1}$, would have selected a fourth catalyst layer that satisfied these relationships. Again, contrary to the argument in the Action as quoted above, the art does not disclose that the three stage catalyst of Angevine satisfies the claimed relationship. Therefore, there can be no motivation to specifically select a fourth catalyst stage that satisfies the relationship.

For this reason also, Angevine does not properly support a case of prima facie obviousness of the reactor for hydrotreating of the present invention.

The foregoing is believed to be a complete and proper response to the Office Action dated June 11, 2002, and is believed to place this application in condition for allowance. If, however, minor

issues remain that can be resolved by means of a telephone interview, the Examiner is respectfully requested to contact the undersigned attorney at the telephone number indicated below.

In the event that this paper is not considered to be timely filed, applicants hereby petition for an appropriate extension of time. The fee for any such extension may be charged to our Deposit Account No. 111833.

In the event any additional fees are required, please also charge our Deposit Account No. 111833.

Respectfully submitted,
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